

REMARKS

Applicants wish to thank the Examiner for the courtesies extended to the undersigned during the telephone interview of March 3, 2003.

Applicants appreciate the indication that claim 58 recites allowable subject matter.

Applicants hereby add new claims 59-60. Accordingly, claims 36-42 and 53-60 are pending in the present application.

Claims 36, 40, and 42 stand rejected under 35 USC 102(e) for anticipation by U.S. Patent No. 6,048,256 to Obeng et al. Claims 37 and 38 stand rejected under 35 USC 103(a) for obviousness over Obeng et al. Claims 39, 41, and 53-57 stand rejected under 35 USC 103(a) for obviousness over Obeng et al. in view of Uzoh.

Applicants respectfully traverse the rejections and urge allowance of the present application.

Claim 36 recites *supplying slurry to a semiconductor process chamber and monitoring the turbidity of the slurry during the supplying.* Claim 36 is patentable over the prior art.

As recited on page 2 of the Office Action, reference 180 corresponds to a polishing apparatus and reference 115 corresponds to a slurry dispenser. Accordingly, slurry dispenser 115 provides slurry 160 to polishing apparatus 180. The Obeng reference is entirely devoid of disclosing or suggesting monitoring turbidity of slurry supplied to a semiconductor process chamber within dispenser 115 using a sensor. Dispenser 115 of Obeng operates to supply slurry 160 to polishing apparatus 180 and the Obeng reference is devoid of any monitoring of slurry supplied within dispenser 115 or a sensor configured to monitor slurry within dispenser 115, or other structure configured to monitor turbidity of

slurry during the supplying as positively claimed. Paragraph 2 on page 2 of the Office Action refers to teachings in column 2, lines 61-67 of Obeng as allegedly disclosing a sensor for monitoring turbidity. Such teachings refer to a *physical parameter sensor system coupled with a mixing chamber* configured to sense a physical property of the slurry during mixing. Referring to teachings in column 4, lines 57-67 of Obeng, the physical parameter sensor system is identified as reference 190 which is coupled with the mixing chamber 110. Obeng merely discloses the system 190 arranged to monitor physical parameters of components 121a-121h being mixed. Following appropriate mixing of such components, Obeng fails to disclose or suggest any monitoring of turbidity of slurry supplied to a semiconductor process chamber as recited in claim 36. Obeng expressly provides a slurry dispenser 115 for supplying slurry to polishing apparatus 180 and fails to disclose or suggest any monitoring of turbidity of slurry being dispensed using slurry dispenser 115 or other supply structure.

In no fair interpretation can Obeng's disclosure of monitoring the mixing of components be fairly considered to disclose or suggest *monitoring turbidity of a slurry during the supplying to a semiconductor processor chamber using a sensor* as explicitly recited in claim 36. More specifically, significant changes to slurry may occur between mixing and actual dispensing thereof to a semiconductor processor chamber. For example, settling may occur within plumbing between a mixer and a destination chamber resulting in a slurry of a different turbidity supplied to a chamber which would not be sensed or detected using the arrangement of Obeng. Obeng's sensing of a slurry within a mixer does not disclose or suggest monitoring turbidity of slurry during the supplying to a semiconductor process chamber using a sensor as recited in claim 36. Claim 36 recites

limitations not shown or suggested in the prior art of record and claim 36 is allowable for at least this reason.

The Office Action identifies references 123a-123h as allegedly providing slurry supplying connections. Applicants refer to the teachings in Col. 4, lines 27-30 of Obeng stating that 123a-123h refer to metering devices to introduce chemical components 121a-121h to mixing chamber 110 at an appropriate rate to adjust the composition of slurry 160. Accordingly, references 123a-123h meter individual components used to form a slurry and do not supply slurries. The teachings of Obeng regarding the operation of references 123a-123h fail to disclose or suggest monitoring turbidity of a slurry during supplying to a semiconductor process chamber using a sensor as recited in claim 36. Claim 36 is allowable over the prior art.

The claims which depend from independent claim 36 are in condition for allowance for the reasons discussed above with respect to the independent claim as well as for their own respective features which are neither shown nor suggested by the cited art.

With reference to claims 37 and 38, it is stated on page 3, paragraph 4 of the Office Action that Obeng does not disclose the specific location of the sensor. Thereafter, it is stated that the specific location would have been obvious since it is within the general skill of the worker in the art to rearrange parts of an invention on the basis of its suitability for the user's preference as a matter of obvious design choice. Applicants disagree.

Obviousness rejections require sufficient motivation to combine and/or modify reference teachings. Referring to MPEP §2143.01 (8th ed.), there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine reference teachings. The

mere fact that references *can* be combined or modified does not render the resultant combination obvious *unless the prior art also suggests the desirability of the combination.*

MPEP §2143.01 *citing In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

Obeng discloses a sensor system 190 coupled directly with a mixing chamber and capable of collecting data regarding turbidity. Obeng is concerned with monitoring of turbidity and other physical parameters of slurry *during mixing operations* as clearly recited in column 4, line 57 spanning to column 5, line 5 of Obeng wherein it is disclosed that system 190 may sense temperature and the temperature of slurry may be adjusted around mixing chamber 110. There is absolutely no motivation for one of skill in the art to modify the teachings of Obeng to arrive at the positively recited method of claim 37 reciting supplying slurry using a supply connection and monitoring slurry within the supply connection. Why would one be motivated to modify the Obeng teachings concerned with monitoring slurry during mixing operations to monitoring slurry within a supply connection where no mixing occurs? Obeng specifically refers to changing operations of mixer 110 and adjusting parameters or conditions within mixer 110 with no mention of monitoring turbidity of a slurry supplied within a supply connection to a semiconductor process chamber. Without improper usage of Applicants' disclosure, one would not be motivated to modify Obeng to arrive at the method of claim 37 and the 103 rejection of claim 37 is improper for at least this reason.

With reference to claim 38, Obeng is devoid of disclosing or suggesting how coupling of any sensor is to occur. One would not be motivated to modify the Obeng teachings regarding monitoring mixing operations of a mixer to arrive at Applicants' method of claim 38 reciting coupling the sensor with the supply connection. The obviousness

rejection of claim 38 without proper motivation is improper and Applicants respectfully request withdrawal of the obviousness rejection of claim 38 for at least this reason.

Applicants traverse and seasonably challenge under MPEP §2144.03 (8th Edition) the assertion in the Office Action that the location of the sensor is obvious and a mere matter of obvious design choice stated in support of the 103 rejection. Judicial notice is construed narrowly and facts found in such a manner are taken with an eye toward narrowing the scope of any conclusions to be drawn therefrom. Assertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art and the applicant given, in the Patent Office, the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference. Allegations concerning specific knowledge of the prior art, which might be peculiar to a particular art should also be supported and the applicant similarly given the opportunity to make a challenge. *In re Pardo*, 684 F.2d 912, 214 USPQ 673, 677 (C.C.P.A. 1982).

Accordingly, Applicants request withdrawal of the 103 rejection of claims 37, 38 for at least this additional reason. If such claims are not found to be allowable in the next Action, Applicants *once again* respectfully request submission of an affidavit or prior art which allegedly discloses positively recited limitations of claims 37 and 38 in support of the 103 rejection so Applicants may appropriately respond.

Further, Applicants refer to the statement that Obeng does not disclose a specific location of a sensor. Applicants note that Obeng only teaches or suggests monitoring of turbidity during mixing operations of the slurry. There is absolutely no teaching or suggestion of subsequent monitoring slurry after mixing and during the supplying. The

interpretation of the Office Action is contrary to the explicit teachings of Obeng and is in no fair interpretation "a matter of obvious design choice" as alleged. Applicants have now twice traversed the assertion of obvious design choice and an affidavit is required in accordance with the MPEP to support the Examiner's assertions if the rejection of claims 37-38 is maintained.

The claims which depend from independent claim 37 are in condition for allowance for the reasons discussed above with respect to the independent claim as well as for their own respective features which are neither shown nor suggested by the cited art.

Referring to the rejection of claim 53, it is stated that Obeng fails to disclose electromagnetic energy. Thereafter, the Examiner relies upon teachings of Uzoh as allegedly disclosing electromagnetic energy. In particular, the Examiner identifies teachings in col. 10, line 58, as allegedly disclosing electromagnetic energy. Col. 10, line 58 discloses a sensor which uses a UV visible fiber optic array and other sensor constructions. The combined teachings of Uzoh and Obeng fail to render claim 53 obvious.

Initially, Applicants refer the Examiner to explicit teachings in col. 4, line 54 to col. 5, line 34 of Uzoh. Such teachings refer to UV sensors and other sensor configurations arranged to detect the presence of certain reaction compounds or by products *to detect processing end points during CMP operations*. Referring to Fig. 2, it is clear sensors 25, 27 are positioned only to sense materials expended during polishing and as made clear by the teachings of Uzoh regarding detecting appropriate polishing end points as set forth in cols. 4-5. Such teachings are clearly related to detection of different materials during the polishing to signal end points of processing.

Claim 53 defines supplying slurry to the process chamber using a connection, emitting electromagnetic energy towards the connection, receiving electromagnetic energy, and indicating turbidity responsive to the receiving. Uzoh teachings regarding monitoring endpoints of polishing by detecting different materials expended from polishing operations using electromagnetic energy in no fair interpretation discloses or suggests indicating turbidity being supplied to a chamber and responsive to receiving electromagnetic energy as claimed. In addition, no details of Uzoh are identified as allegedly disclosing the claimed emitting or receiving apart from the cursory mention of UV sensor.

Even if the references are combined, the combination of reference teachings fails to disclose or suggest limitations of claim 53. No monitoring of slurry being supplied in a supply connection is disclosed or suggested by the combination. No indicating turbidity responsive to emitting and receiving electromagnetic energy is disclosed or suggested. Numerous positively-recited limitations of claim 53 are not shown nor suggested by the prior art and claim 53 is allowable for at least this reason.

There is no motivation to combine the reference teachings in support of the obviousness rejection. The Examiner states the combination is appropriate "for the purpose of providing an improved chemical mechanical polishing process" on page 3 of the Action. Such conclusory statements are inappropriate motivation to combine as set forth by the Federal Circuit.

In particular, the Federal Circuit discussed proper motivation *In re Lee*, 61 USPQ 2d 1430 (Fed. Cir. 2002). The motivation identified in the Office Action is akin to the conclusory statements set forth in *In re Lee* which were found to fail to provide the requisite

motivation to support an obviousness rejection. The Court in *In re Lee* stated the factual inquiry whether to combine references must be through and searching. It must be based on objective evidence of record. The Court in *In re Fritch*, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992) stated motivation is provided only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. The *Lee* Court stated that the Examiner's conclusory statements in the *Lee* case do not adequately address the issue of motivation to combine. The Court additionally stated that the factual question of motivation is material to patentability and can not be resolved on subjective belief and unknown authority. The Court also stated that deficiencies of cited references cannot be remedied by general conclusions about what is basic knowledge or common sense. The Court further stated that the determination of patentability must be based on evidence.

In the instant case, the record is entirely devoid of any evidence to support motivation to combine the teachings apart from the bald conclusory statements of the Examiner which are insufficient for proper motivation as set forth by the Federal Circuit. The Office cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims but must set forth rationale on which it relied. Statements set forth in the present Office Action are akin to the alleged motivation discussed *In re Lee* and accordingly are insufficient to combine the reference teachings. The 103 rejection of claim 53 is improper without the proper motivation and Applicants respectfully request allowance of claim 53 in the next Action.

Further, one of skill in the art would not look to Uzoh concerned with determination of end points of CMP processing for meaningful teachings with respect to monitoring of

turbidity during mixing of components as provided by Obeng. Uzoh is silent regarding any turbidity monitoring and there is no motivation to combine the inapposite teachings of Uzoh regarding analysis of expended materials from CMP polishing with monitoring turbidity within a slurry mixing chamber prior to any application of the slurry to the mixing chamber. The Examiner has improperly relied upon Applicant's disclosure for motivation to combine the reference teachings and the rejection of claim 53 is improper for this additional reason.

The claims which depend from independent claim 53 are in condition for allowance for the reasons discussed above with respect to the independent claim as well as for their own respective features which are neither shown nor suggested by the cited art.

Support for the new claims 59-60 may be found on pages 6-11 and accompanying figures 1-3 of the originally-filed application. The new claims are allowable over the prior art.

Applicants request allowance of all pending claims.

The Examiner is requested to phone the undersigned if the Examiner believes such would facilitate prosecution of the present application. The undersigned is available for telephone consultation at any time during normal business hours (Pacific Time Zone).

Respectfully submitted,

Dated: 3/6/03

By:


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